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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,547	12/24/2001	David G. Hostetter	2001-087-ICE	9585

7590 10/31/2005

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EXAMINER	
ALI, SYED J	

ART UNIT	PAPER NUMBER
2195	

DATE MAILED: 10/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/026,547	HOSTETTER ET AL.	
	Examiner	Art Unit	
	Syed J. Ali	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 September 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment filed September 20, 2005. Claims 1-42 are presented for examination.

2. The text of those sections of Title 35, U.S. code not included in this office action can be found in a prior office action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1, 15, 29, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

5. The following claim language is indefinite:

a. With respect to the newly added limitation in the independent claims of "specifying a particular level of lag", it has not been demonstrated or made clear exactly where the "specifying" comes from, i.e. whether the "specifying" is done by a user or automatically, either statically or dynamically in response to changing conditions. The limitation will be given its broadest reasonable interpretation, i.e. any specification of a lag will suffice.

b. It is unclear what the "synchronicity setting" is specified as. The setting could be a lag based on units of time or by workload. Applicant has failed to demonstrate a sufficient level of detail regarding the condition that a "synchronicity setting" is intended to regulate, i.e. time or workload. Claims 6 and 7 indicate that the synchronicity setting could be either a number of operations or a unit of time. Therefore, the claim will be treated as though specifying a level of lag in accordance with either a lapse of time or workload meets the claim limitations.

Claim Rejections - 35 USC § 103

6. **Claims 1-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sicola et al. (USPN 6,601,187) (hereinafter Sicola).**

7. As per claim 1, Sicola teaches the invention as claimed, including a method for synchronizing transactions, comprising:

specifying a particular level of lag, said particular level of lag being a specified synchronicity setting (col. 11 lines 17-24; col. 12 lines 4-15);

executing a series of commands at a first computing entity (col. 12 lines 17-25);

controlling a level of lag between computing entities by relaying the series of commands to a second computing entity (col. 12 lines 47-56) until said synchronicity setting is reached (col. 11 lines 17-24); and

wherein the second computing entity lags behind the first computing entity by an amount of lag that is no greater than said specified synchronicity setting (col. 11 lines 17-19).

8. Though Sicola does not specifically require postponing relaying additional commands after said synchronicity setting is reached, such is an obvious modification of the asynchronous data replication method disclosed therein, particularly when viewed in relation to Sicola's method of synchronous data replication. Sicola teaches that in a synchronous mode of operation, each input/output command that is entered at the host computer is replicated at a remote computer, and a subsequent command does not begin until the first command has been verified as complete (col. 11 line 43 - col. 12 line 3). However, certain constraints make this type of operation undesirable, as a system experiences downtime while waiting for the remote acknowledgement (col. 11 lines 35-42).

In contrast, asynchronous operation allows a series of commands to be entered at a first computer before requiring acknowledgment of completion of the replication at the remote site. This results in a lag between the operations, but is assured of eventual synchronization over time (col. 11 lines 17-24; col. 12 lines 6-15). This leaves open the question of what to do in the case of a delay at the remote site, which could be caused by numerous factors, including a simple bottleneck. Sicola is deliberately silent on this issue, as it is not within the scope of the disclosure (col. 12 lines 64-67, "If the remote copy was unsuccessful for other reasons, then...other error recovery procedures...are invoked.") Thus, there is a glaring need to fill in the blank of how to handle such a condition.

Sicola's synchronous mode of operation provides an obvious remedy that is the same as provided by the claimed invention, namely to wait for acknowledgment of completion from the remote site. It could be said that Sicola inherently discloses this feature, or at the least that it obviously follows from the open-ended teachings of the asynchronous mode of operation. Specifically, Sicola states that "the remote site may lag behind by a bounded number of write I/O operations." (col. 11 lines 17-24). Thus, when the number of operations the remote site lags behind the host reaches the bound, it would have been obvious to one having ordinary skill in the art to cease initiation of new operations until at least one completion notification has been received. The discussion presented herein relates to all other independent claims presented in this application, and is hereby incorporated by reference into the rejections of those claims.

9. As per claims 2-3 and 10-11, Sicola teaches the invention as claimed, including the method of claim 1, wherein the first and second computing entities are computer peripherals, i.e. storage systems (col. 6 line 62 - col. 7 line 10).

10. As per claims 4 and 12, Sicola teaches the invention as claimed, including the method of claim 1, wherein the first and second computing entities are computers (col. 8 lines 50-62).

11. As per claims 5 and 13, Sicola teaches the invention as claimed, including the method of claim 1, wherein the first and second computing entities are computer programs (col. 8 lines 50-62).

12. As per claim 6, Sicola teaches the invention as claimed, including the method of claim 1, wherein the amount of lag and the specified synchronicity setting are measured as numbers of commands executed (col. 11 lines 17-19).

13. As per claim 7, Sicola teaches the invention as claimed, including the method of claim 1, wherein the amount of lag and the specified synchronicity setting are measured as amounts of time (col. 9 lines 54-61).

14. As per claims 8-9 and 32, Sicola does note specifically teach the invention as claimed, wherein the amount of lag and the specified synchronicity setting are measured as amounts of data or as numbers of devices with outstanding commands to execute.

15. "Official Notice" is taken that there are a multitude of well-known ways of specifying lag or delays, including the use of buffers (an amount of data is collected before transmission) or acknowledgments (a device sends an indication of completion to the issuing device). It would have been obvious to one of ordinary skill in the art to look to other methods of synchronization to ensure that all data is properly recorded.

16. As per claim 14, Sicola teaches the invention as claimed, including the method of claim 1, wherein the series of commands is for a peer-to-peer remote copy operation (col. 9 lines 9-19).

17. As per claims 15-28, Sicola teaches the invention as claimed, including a computer program product in a computer-readable medium comprising functional descriptive data that, when executed by a computer, enables the computer to perform the method of claims 1-14, respectively (col. 6 line 62 - col. 7 line 10; col. 8 lines 50-62).

18. As per claim 29, Sicola teaches the invention as claimed, including a computer program product in a computer-readable medium comprising functional descriptive data that, when executed by a computer, enables the computer to perform acts including:

specifying a particular level of lag, said particular level of lag being a specified synchronicity setting (col. 11 lines 17-24; col. 12 lines 4-15);

copying extents of data from a host to a first storage system pursuant to instructions from the host (col. 12 lines 17-25);

controlling a level of lag between storage systems by relaying the instructions to a second storage system (col. 12 lines 47-56) until said synchronicity setting is reached (col. 11 lines 17-27); and

wherein the second storage system lags behind the first storage system in copying the extents of data by an amount of lag that is no greater than said specified synchronicity setting (col. 9 lines 54-61).

19. As per claim 30, Sicola teaches the invention as claimed, including the computer program product of claim 29, wherein the amount of lag and the specified synchronicity setting are measured as numbers of instructions executed (col. 9 lines 54-61).

20. As per claim 31, Sicola teaches the invention as claimed, including the computer program product of claim 29, wherein the amount of lag and the specified synchronicity setting are measured as amounts of time (col. 9 lines 54-61).

21. As per claims 33 and 34-42, Sicola teaches the invention as claimed, including a data processing system, comprising:

a processing unit including at least one processor (col. 6 line 62 - col. 7 line 10; col. 8 lines 50-62);

memory (col. 6 line 62 - col. 7 line 10; col. 8 lines 50-62); and

a set of instructions within the memory, wherein the processing unit executes the set of instructions to perform the method of claims 1 and 6-14, respectively (col. 6 line 62 - col. 7 line 10; col. 8 lines 50-62).

Response to Arguments

22. **Applicant's arguments with respect to claims 1-42 have been considered but are moot in view of the new grounds of rejection.**

Conclusion

23. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J. Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T. An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Syed Ali
October 21, 2005